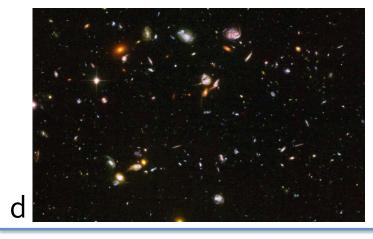
Metacalibration:

a method for directly estimating and calibrating biases in shears from real data

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d(shear)

d(systematic)



The goal: Determine the response of the entire shear pipeline to systematics, for a fully realistic galaxy population (no external simulations)

- 1. Deconvolve the PSF from the data image.
- 2. Shear the de-convolved data image

- These steps reveal Fourier modes that were hidden by PSF.
- Reconvolution to a slightly larger PSF is necessary to hide these.

- 3. Re-convolve to a new, slightly larger PSF.
- 4. Re-run the entire pipeline.

Measured shear response is only valid for larger PSF.

MetaCalibration's virtues

- It calibrates the shear for the real galaxy population (by design)
- Includes a realistic PSF and noise field
- Can wrap any shape- or shear-estimation method
- It automatically accounts for selection biases

This is complementary to other approaches, avoids some of their limitations, and can be used for cross-validation

What about systematics?

- MetaCalibration was initially intended to get the shear calibration (i.e., response of shear estimator to a shear of a given size)
- Then we realized that we could also test the response of the shear estimator to certain systematics after step (3) – at the expense of more resimulations.
 - Simple example: including bad columns.
 - More complex re-simulation is possible, at the expense of modifying the noise field (which can be fixed)

Open questions

- For what sensor effects can this approach be used?
- For what sensor effects would this provide a useful complement to independent forwardsimulation?